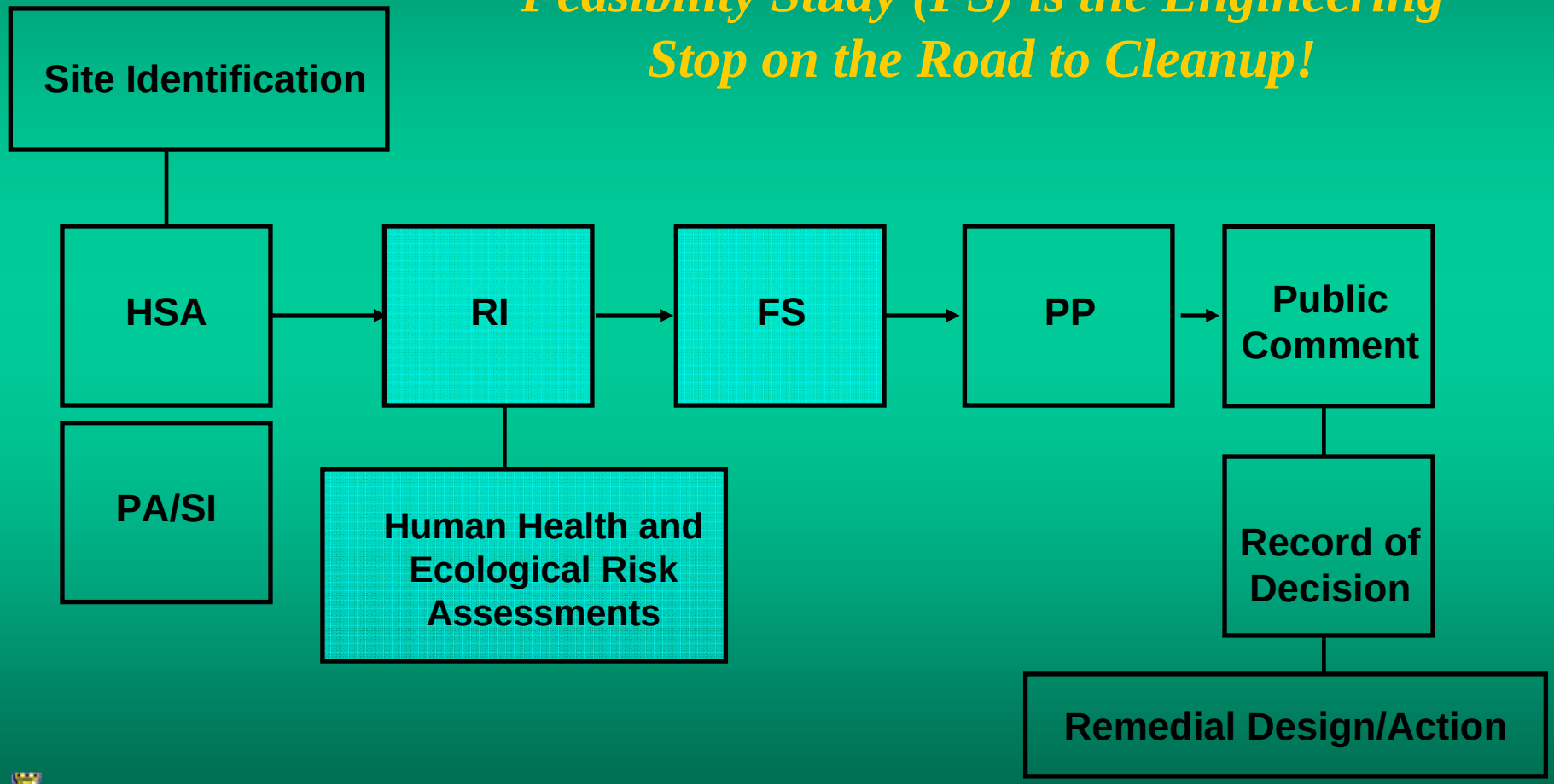
Environmental Cleanup Process

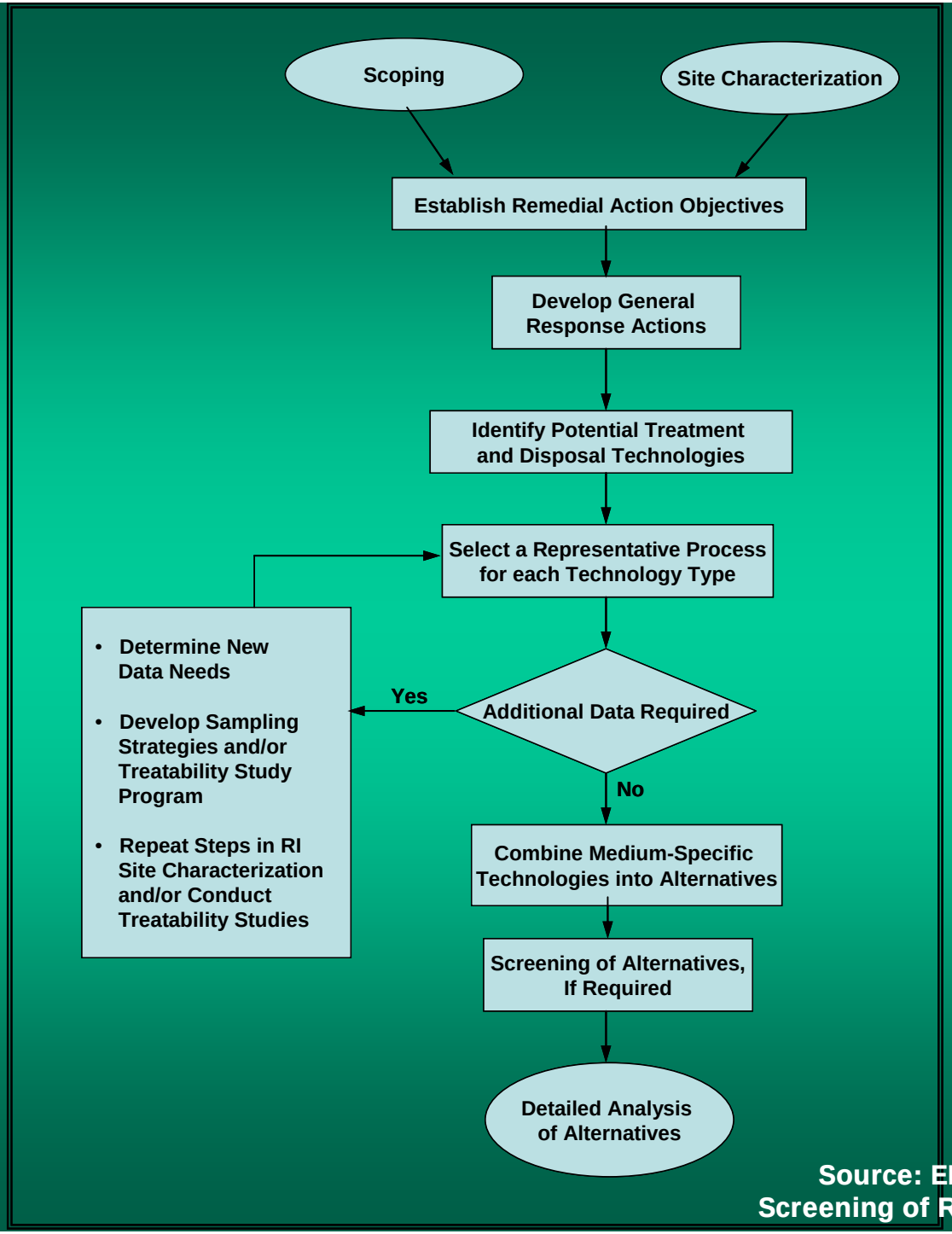
Feasibility Study (FS) is the Engineering Stop on the Road to Cleanup!



Chambers Works FUSRAP FS Process

- Define the problem
- Identify established standards
- Formulate objectives
- List ways to meet objectives
- Define alternative remedial “packages”
- Evaluate

FS Process



Philadelphia District
US Army Corps of Engineers

Source: EPA FS Development and Screening of Remedial Action Alternatives

ARARs

- Applicable, OR Relevant and Appropriate Requirements
- “How clean is clean”

Cleanup decisions need to comply with other state and federal environmental laws and regulations - CERCLA Section 121(d)

Remedial Action Objectives for Soils

- Reduce/eliminate risks associated with exposure to site contaminants.
  - Prevent exposures to soils with residual contamination.
  - Reduce/eliminate the volume, toxicity, and mobility of contaminated soils.
  - Minimize the possibility of contaminants moving offsite via groundwater or surface water.

Specific cleanup goals will be established in the FS. Concentrations above these goals will require a remedial action.

Remedial Action Objectives for GW

- Comply with ARARs
- Monitor, control, or actively reduce contaminants in groundwater
- Prevent any contaminant releases or environmental impacts during cleanup actions
- Restore the site to a condition consistent with its current and anticipated future uses

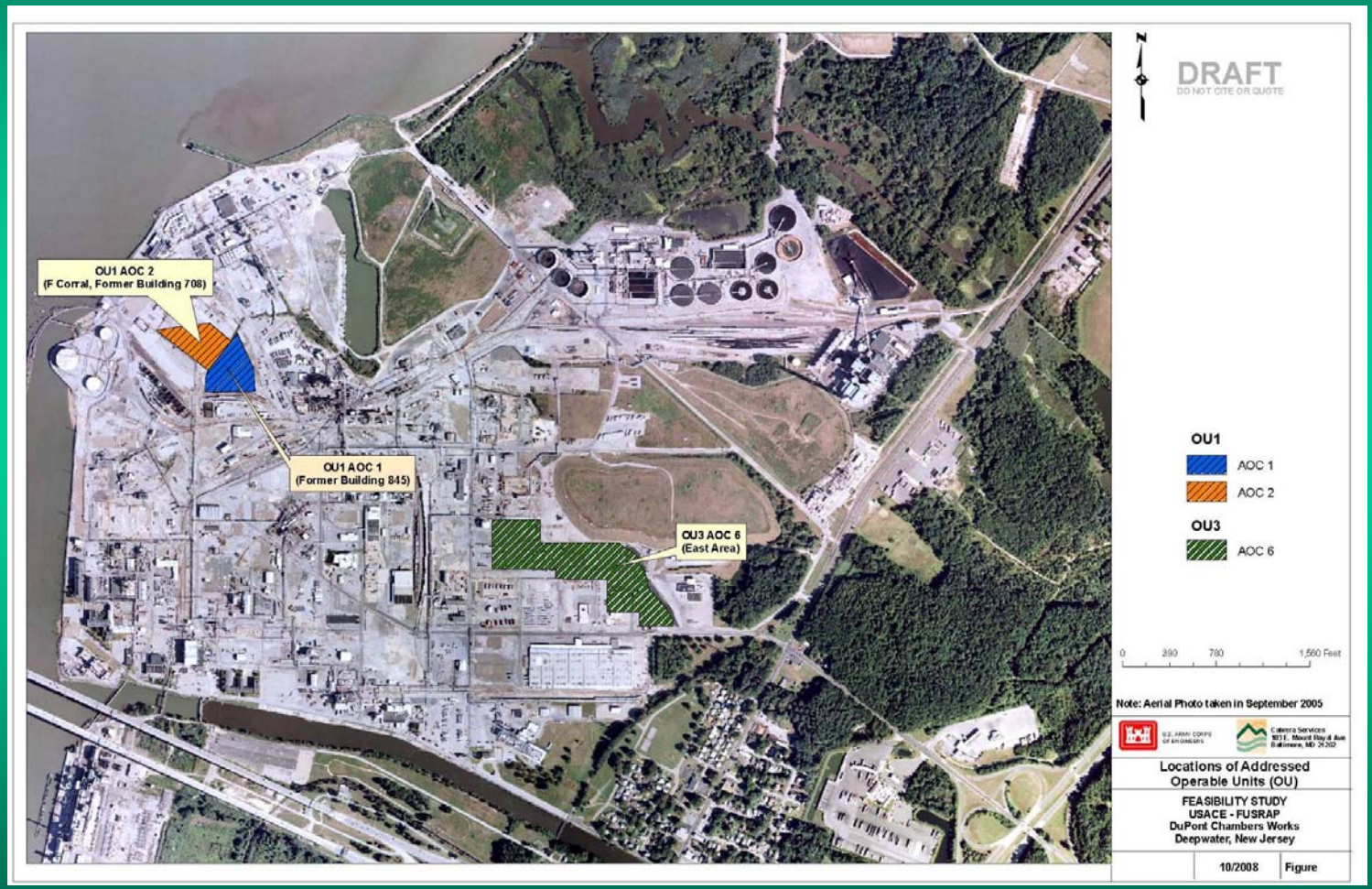
Typical Remedial Action Technologies

- No action (baseline)
- Institutional control
- Monitoring (short and long-term)
- Containment
- Treatment
- Transportation
- Off-site Disposal

CERCLA Remedy Selection Criteria

- Protect human health & environment
- Comply with other laws (ARARs)
- ✓ **Long term effectiveness and permanence**
- Reduce waste volume, toxicity, mobility
- Short-term effectiveness
- ✓ **Implementability**
- ✓ **Cost**
- State acceptance
- Community acceptance

Areas Requiring Evaluation



Remedial Evaluation

- Evaluate “No Action” (Baseline)
- Recognize Preference for Treatment (CERCLA/SARA)
- Understand Shallow Groundwater (Dewatering the Excavations = Major Headache)
- Follow Criteria:
  - Effectiveness
  - Implementability
  - Cost

Possible Technologies for Initial Evaluation: Soil

- Dig & Haul
- Volume Reduction (Size fractionation)
  - Critical dependence on some grain size fractions containing most of the “problem”
- Soil Washing
- Immobilization
  - *In-situ*
  - *Ex-situ*

Possible Technologies for Initial Evaluation: Groundwater

- Monitored Natural Attenuation
- Redox Manipulation